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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,356

09/18/2006

Michael Shannon Mccorquodale

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EXAMINER

GOODLEY, JAMES E

ART UNIT

PAPER NUMBER

2817

MAIL DATE

DELIVERY MODE

08/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,356	Applicant(s) MCCORQUODALE ET AL.	
	Examiner JAMES E. GOODLEY	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 28-32 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/18/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/18/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7-26, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Duncan et al. (US 2003/0030497)*** in view of ***McCorquodale et al. (US 6,972,635)***.

Regarding **claims 1-5, 7-26, 29 and 30**, Fig. 45I of Duncan discloses an apparatus for frequency control, the apparatus comprising:

a resonator [LC tank comprising inductors 4509 and varactors 4515], the reference resonator adapted to provide a first signal having a resonant frequency;

a negative transconductance amplifier [NMOS drivers M1 and M2] coupled to the resonator; and

a frequency controller [current mirror 4536 and current source adaptive bias 4522] coupled to the amplifier and coupled to the resonator, the frequency controller adapted to modify the resonant frequency of the reference resonator in response to at least one variable of a plurality of variables (frequency, temperature and fabrication process variations – see paragraph 549).

The cascode current mirror/voltage isolator and adaptive bias modify a current through the amplifier (and therefore the transconductance and oscillation frequency) according to temperature variation and according to the supply voltage.

The temperature dependent current mirror source 4536 comprises first and second transistors [M4, M5], a diode [diode connected M6] and a resistor [R2].

Line 42 of column 6 to line 7 of column 12 and lines 62-65 of column 20 disclose the usage of first and second MOS transistors being biased in strong inversion and weak inversion (subthreshold region).

Duncan fails to specifically disclose that the resonator is a reference resonator to create a reference clock (as the oscillator is a VCO, tuned from another external crystal oscillator in a PLL circuit).

However, McCorquodale discloses in Figs. 4-7 a biased integrated MEMS LC oscillator. McCorquodale discloses in lines 32-60 of column 1 and lines 41-44 of column 4 the desire for a low-cost integrated oscillator that does not require an external crystal clock generator. The LC tank of Fig. 6 and oscillator of Fig. 7 disclosed in column 19 and 20 are the inventive solution to the problem. Thus, the LC oscillator of McCorquodale is a fully integrated clock generator that does not require an external clock generator for tuning.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LC oscillator device of Duncan by using it as a reference clock generator, without being tuned from an external clock source in a phase locked loop (PLL), as suggested by McCorquodale, for the purpose of making a low-

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cost and fully integrated clock generator that is substantially insensitive to process and temperature variation.

Claims 6, 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Duncan et al. (US 2003/0030497)* in view of *McCorquodale et al. (US 6,972,635)* in further view of *Hayashi et al. (US 5,180,995)*.

Regarding **claims 6, 28, 31 and 32**, the device of Duncan in view of McCorquodale fails to specifically disclose, wherein the current source has one or more configurations selected from a plurality of configurations, the plurality of configurations comprising CTAT, PTAT, and PTAT² configurations.

However, Hayashi discloses in Fig. 1 and the abstract a temperature compensation current mirror utilizing a CTAT [thermistor R2, having a negative temperature coefficient] and a PTAT [thermistor R1, having a positive temperature

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Duncan in view of McCorquodale, by including a PTAT and CTAT in the current mirror, as such thermistors are conventional in the art and using both a PTAT and CTAT in the current mirror would provide a more accurate temperature compensation to provide a more accurate oscillation frequency.

Allowable Subject Matter

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Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding **claim 27**, the device of Duncan in view of McCorquodale fails to disclose or suggest, wherein a first set of transistors of the plurality of transistors are operable in strong inversion and a second set of transistors of the plurality of transistors are operable at a subthreshold voltage.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES E. GOODLEY whose telephone number is (571)272-8598. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Pascal can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James E Goodley/

Examiner, Art Unit 2817

/Robert Pascal/

Supervisory Patent Examiner, Art Unit 2817